# Multiliteracies and Active Learning in CLIL—The Development of LearnWeb2.0

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**Abstract**—This paper discusses the development of LearnWeb2.0, a search and collaboration environment for supporting searching, organizing, and sharing distributed resources, and our pedagogical setup based on the multiliteracies approach. In LearnWeb2.0, collaborative and active learning is supported through project-focused search and aggregation, with discussion and comments directly linked to the resources. We are developing the LearnWeb2.0 platform through an iterative evaluation-driven design-based research approach—this paper describes the first iteration and part of the second one. In the first iteration, we developed LearnWeb2.0 and evaluated it in two *Content and Language Integrated Learning* (CLIL) courses We followed the multiliteracies approach, using authentic content from a variety of sources and contexts to provide important input for CLIL. We present evaluation design and results for both courses, and discuss how the differences in both scenarios influenced student performance and satisfaction. In the second iteration, we improved LearnWeb2.0 based on these experiences—we describe improvements as well as problems addressed. Finally, we sketch the evaluation planned for the second cycle, and close with a reflection of our experiences with the design-based research approach for developing a collaborative learning environment, and on multiliteracies as a suitable approach for CLIL.

**Index Terms**—Content and language integrated learning, multiliteracies, design-based research, collaborative search

## 1 Introduction

Today's knowledge-based society demands different attitudes than in the past regarding learning and work skills. Web 2.0 tools and social software applications provide new means to connect people to digital knowledge repositories and to other people in order to share ideas, collaboratively create new forms of content, get effective support, and learn with and from peers. The success of Web 2.0 and platforms such as YouTube or Flickr demonstrates that people are willing to share resources with other people in their private life.

This inspired us to build on Web2.0 ideas to support active and project-oriented learning in *Content and Language Integrated Learning* (CLIL). CLIL is one of the most promising approaches in language learning attempting to take in consideration the needs of students in the changing society. According to Marsh [20], "To be effective in a society where developing communication skills and building intercultural knowledge is important, language teaching needs to diversify classroom methodology, provide opportunities to study content through different perspectives, and increase learners' motivation and confidence in both the language and the subject being taught." Exposure to the foreign language in real-life contexts as well as the use of authentic subject-specific materials can be more effective than foreign language textbooks [29]. But it is still difficult to find good material for CLIL; teachers spend a lot of time in preparing suitable material for their class. We wanted to address this need with our platform, providing search and sharing capabilities across web and Web2.0 sources.

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Based on this motivation, we have been developing and improving our LearnWeb2.0 platform for CLIL, initially planned as a simple search environment for sharing resources and integrating existing Web2.0 systems [1], [18]. LearnWeb2.0 now supports learners and educators in discovering, sharing, managing, and critically working with web resources, around core collaborative search functionalities, through an easy-to-use interface.

In this paper, we describe the development of our system as well as our pedagogical setup, and discuss our experiences focusing on the following two questions: 1) What pedagogical and project design should be used to support CLIL at universities to foster student reflection on methods and materials appropriate for CLIL? 2) How can an infrastructure for collaborative searching be appropriately used and adapted to help in the process of language learning and teaching in a CLIL context?

Regarding the first question, based on suggestions of and discussion with our CLIL colleagues, we suggest a course design based on the *multiliteracies approach*, first described in "A pedagogy of multiliteracies: Designing social futures" [23], continued and refined in [16]. The multiliteracies approach addresses *textual multiplicity* as the multiplicity of communication channels and media, as well as cultural and linguistic diversity, and stresses the need to use authentic and diverse language learning materials and situations, instead of focusing on teaching and learning grammar rules and vocabulary independent of the context where communication takes place.

Regarding the second question, we report how we developed, evaluated, and improved our system using an *iterative evaluation-driven design-based research approach* [13]. In contrast with traditional evaluation methodologies the study is not conducted "objectively" (independently from the context) and its goal is not only to give an accurate representation of the actual situation, but the intention is to

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involve users in an interactive and qualitative process of formative evaluation. Developers and evaluators work together to test the system, collect the feedback, and implement the improvements in the new version. Using this approach, after having designed and implemented a first LearnWeb2.0 version,

1. incorporating our initial ideas on architecture, functionalities, and interface, we evaluated the system
2. in two university CLIL courses, to get feedback from teachers and students about what works and where we had to improve,
3. implemented a second LearnWeb2.0 version to address the feedback and our insights gained during the first cycle, with the main changes regarding the usability of the system, including substantial speed and interface improvements,
4. started a second evaluation round to get further feedback and insights for improvements.

Our paper aims at advancing the state of the art by 1) providing an account of our experiences with the multiliteracies approach for CLIL, as a suitable pedagogical setup for language learning, 2) discussing how the LearnWeb2.0 platform can support this approach and how it has been used in two courses in Germany and Italy, and suggestions for the use of LearnWeb2.0 in diverse settings, and 3) presenting our reflections about a research-based design approach and how it has helped us to implement and improve, over a period of more than two years, crucial functionalities and interface features of our platform, based on feedback from and interaction with CLIL colleagues and students.

The next section provides relevant background regarding the multiliteracies approach, the conceptual design of LearnWeb2.0, and a short discussion of the design-based research paradigm; Section 3 discusses related work. In Section 4, we describe the conceptual design of LearnWeb2.0, its architecture, and its implementation. Section 5 describes our first two big case studies in Hannover and Pavia, presenting the tasks we designed, discussing how these tasks were supported by LearnWeb2.0, and which problems occurred. Section 6 gives an overview over the main improvements in the second LearnWeb2.0 version to address feedback and critical issues discovered during the first cycle. We also discuss the second evaluation cycle, with preliminary results and plans for the current year. Finally, we reflect on our experiences on the design-based research approach for our LearnWeb2.0 development, and on the multiliteracies approach for CLIL.

## 2 Relevant Background

### 2.1 Pedagogical Approach—Multiliteracies in CLIL

*Multiliteracies.* Our pedagogical setup is based on the multiliteracies approach and the *Learning by Design* framework. Already in 1996, in their manifesto "A pedagogy of multiliteracies: Designing social futures" the New London Group authors coined the term multiliteracies which addresses *textual multiplicity* as the multiplicity of communication channels and mass media, as well as cultural and linguistic diversity [23]. Their manifesto is influenced by the observation, that in modern society, working, public and private lives are influenced by technological development and by cultural changes, and people have to cope with a pluralism of situations and multiple social layers that are in complex relation to each other. In this context, learning to understand different ways of communication and different languages is very important in order to better understand the world around us.

They suggest that a new pedagogy is required to support this different learning style, as well as tools that support teachers and students in this context. In particular for language teaching and learning, grammar and vocabulary are not considered as crucial as they were in the past, instead the focus has to move to context and the various communication channels we engage with. The multiliteracies approach shares many ideas with the constructivistic concepts of scaffolding and zone of proximal development [28] where the basic idea is that cognitive development is directly linked to social development and that the way a student thinks and what he learns derives from the environment in which he lives. It adds additional important elements, though, which we discuss below.

First, the notion of *Design* plays a central role in the multiliteracies approach. Design includes three aspects: *Available Designs* (available meaning-making resources and conventions of meaning in a particular context, which have to be gathered and understood); the *Designing* one does (the process of shaping meaning, which involves representation, transforming, recontextualization of the Available Designs); and *The Redesigned* (the outcome of Designing, something through which meaning-makers create new meaning-making resources and remake themselves, i.e., learn) [16].

Second, the authors suggest a more complete range of pedagogical orientations which, in addition to traditional literacy teaching and *Overt Instruction* (to transmit language rules and instil good practice from literary models) and *Situated Practice* (immersion or natural learning models), include two other pedagogical dimensions such as *Critical Framing* and *Transformed Practice* [16]:

*Situated Practice* involves immersion in experience and the utilization of Available Designs. In a learning situation students can work with resources already available (e.g., provided by the teacher, available in the classroom or at home), or they can search for new resources and less familiar texts to be discussed, analyzed, and understood.

*Overt Instruction* involves systematic, analytical, and conscious understanding of the elements of different modes of meaning. Students need to understand how the process of Design happens and how to describe and interpret the elements of Design. They need to develop and use a metalanguage which helps them in naming and describing processes and patterns of Design.

*Critical Framing* means interpreting the social and cultural context of particular Designs. Students should learn how to stand back from the specific contents they are studying and analyze them critically in relation to the context. They should interpret and understand the aim of a specific Design, why that content has been designed in that way and what it means in that specific context.

*Transformed Practice* entails the transformation of meanings so that they can be transferred and used in other contexts. Students can, for example, take an Available Design and apply it in a different context, or take available contents

and apply a different Design to them or create a Design anew, adding something personal to the process of transformation.

In the *multiliteracies* framework, teaching and learning include a mix of these four orientations, even though not necessarily in any particular fixed sequence. A pedagogy of *multiliteracies* must be flexible and allow alternative forms of engagement for different learners with divergent learning. This is well suited for supporting university courses where language learning has to go beyond sets of grammar rules and vocabulary, and instead includes as important ingredient reflection on text as well as understanding of how texts and genres interact toward making meaning in context.

*CLIL Education*. CLIL stands for *Content and Language Integrated Learning,* that means, learning a language through a subject. The European Commission website[1] stresses the benefits of CLIL when building intercultural knowledge and understanding, developing communication skills, improving language competences, developing multilingual interests and attitudes, providing opportunities to study content through different perspectives, diversifying classroom methodology, and increasing learner motivation and confidence in both the language and the subject being taught.

CLIL requires an adjustment in methodology to ensure that students understand the content, and teachers have to think of other means (e.g., group work, tasks, discussion) which actively involve students while providing teachers with additional possibilities for feedback, regarding the language as well as the content being taught.

Current research in the field focuses mainly on the structural and lexical aspects of language [10], [26]. We deal with the content and collaboration aspects relevant for CLIL. We focus on CLIL methodology and how to support learners and teachers during the learning process. We adopt a real life and explorative learning approach where students work collaboratively on a project, collecting, discussing, and designing CLIL materials.

According to the multiliteracies approach, resources are constructed and dynamically transformed by the users, through a variety of available communication channels and media, into different representations reflecting cultural and linguistic diversity. Such transformation is a result of moving through the four parallel knowledge processes of the multiliteracies pedagogy (*Experiencing*: Situated Practice, *Conceptualizing*: Overt Instruction, *Analyzing*: Critical Framing, *Applying*: Transformed Practice). Educational setup and tools should support students in each of these processes.

In the curricular model [31], the role of language in the CLIL classroom differs from traditional foreign language learning. It is a medium through which specific subject content is learned that provides a link to cognitive processes. Supporters of CLIL argue it is superior to conventional language teaching because of its higher frequency of exposure to authentic language and texts. At this *situated practice* level, the student explores the available resource space by searching for suitable material. This exploration can be supported through an intuitive visual interface to a search space containing appropriate resources. Learners become more competent in a foreign language as they are exposed to it for longer time periods than in conventional language teaching and use a foreign language as a working language for the content subject.

However, it is not only interaction which becomes authentic in the CLIL classroom: subject-specific materials can be more credible content wise than foreign language textbooks. Language is presented in real-life contexts in which the natural use of language can boost the learner's motivation. Language is a means, not an end, and when learners are interested in a topic they will, hopefully, be motivated to acquire language to communicate. A supervisor can improve the process organizing and conceptualizing, through *overt instruction,* providing an initial set of materials, theory, and guidelines.

A CLIL classroom offers a good environment for explorative learning: exploring the content subject and experimenting with specific aspects of the subject are natural activities. *Critical framing,* analyzing results, helps put work into context. Comments, critical discussion, and exchange of ideas should be supported through the learning environment. Learning and project work are easier to embed into CLIL than in a conventional language classroom. *Transformed Practice* captures this phase, with new designs as final result, made available for new groups of students.

### 2.2 Conceptual Design—Collaborative Search

*Search as Part of a Larger Process—Sensemaking*. While the use of web search engines has focused attention on the activity of searching, this activity is really only one part of the entire information access process: information retrieval through searching and browsing, analysis and synthesis of results. Russell et al. [25] describe this process as the process of *sensemaking*, and it is the process we want to support through our platform in the context of CLIL education. The social aspect of this process is emphasized in Evans and Chi [11], who discuss a model for understanding social searching, where they distinguish between different phases of collaborative searching and propose several design suggestions that enhance collaboration during searching.

Based on this model, we view the *sensemaking* process in our platform in three phases: Search and Exploration, Annotation and Discussion, and Upload and Aggregation, and aim to support the user in all three steps. We can connect these phases to the multiliteracies notion of Design, where *Search and Exploration* refer to *Available Designs*, *Annotation and Discussion* help the learner in *Designing,* and *Aggregation and Sharing* address the *Redesigned*.

*Search and Exploration.* Recent studies have shown that social searching and exploration techniques can improve the effectiveness of searching. "SearchTogether" [22] supports searching where group members search simultaneously or collaborate asynchronously by reusing the result history. The most highly rated social annotation features in the interface are query histories, ratings, and comments. In LearnWeb2.0, we enable users to store, rate, comment, tag, and reuse the most successful queries. LearnWeb2.0 allows students to share queries and resources, and collaboratively organize and use them in groups.

*Annotation and Discussion*. Refinding and analyzing materials is an another important task. Social tagging systems allow users to assign keywords for resources for easy subsequent retrieval, creating shared external knowledge structures relating to individual semantic memory

1. http://ec.europa.eu/education/languages/language-teaching/doc236_en.htm.

structure. LearnWeb2.0 provides means for manual resource tagging. Furthermore, the system automatically tags objects with the query terms used by learners when retrieving these objects. Beyond tagging, students can comment any particular resource. These discussions help to improve the work results by critically analyzing materials and collections.

*Upload and Aggregation.* An architecture for storage, management, and dissemination of complex objects and their mutual relationships was proposed in Fedora [26]. In LearnWeb2.0, we use Fedora as the core repository for resource uploading and sharing among users, as well as for searching and exploration of already annotated resources and their groups. Resources can be reintroduced and recycled as new resources with appropriate metadata, supporting a contextualized *sensemaking* process.

### 2.3 Research Methodology: Design-Based Research

The notion of design-based research has been introduced by Brown [6] and Collins [9], who described *design experiments* as a way to advance design, research, and practice concurrently in a principled way. According to Wang and Hannafin [29] design-based research is "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually sensitive design principles and theories." The methodology is pragmatic (refines both theory and practice), grounded (design is conducted in real-world settings), interactive (designers are involved in the design processes and work together with participants), iterative (processes are iterative cycle of analysis, design, implementation, and redesign), flexible (designers can make deliberate changes when necessary), integrative (mixed research methods are used and methods vary during different phases), and contextual (research results are connected with the design process and the setting).

We adopted an *iterative evaluation-driven design-based research approach* for developing LearnWeb2.0, also reflected in the structure of this paper. Sections 4 and 5 describe our first development cycle, with system design and development of the first version, and two extensive case studies carried out in Hannover and in Pavia. Based on the feedback of the first cycle, we implemented a second version of our system (our main improvements are described in Section 6) and we are now in the second evaluation cycle to test and further improve our system.

## 3 Related Systems

The demand for platforms that allow students to share open educational resources is discussed in [13]. In this section, we present several resource repositories 1) as well as discussion and annotation environments 2) and compare them with our LearnWeb2.0 system.

For the first category, *MIT OpenCourseWare*[2] (OCW) is a good example, as a large-scale repository of learning materials for undergraduate and graduate level courses started in 1999-2002 and is supported by a number of Universities around the world. OCW materials are stored in form of textual or multimedia documents including lecture notes, exams, and interactive demonstrations. While OCW sources can be integrated into LearnWeb2.0 as module, our system provides additional functionalities for the collaborative creation of course-supporting materials rather than for their storage only. *ITunesU*[3] is a podcasting platform which integrates the OCW repository and other sources. The lecture podcasts can be viewed on mobile devices of the student to perform self-directed learning without spatial and temporal restrictions. *Edshare*[4] is a content learning and teaching repository created by the University of Southampton. Users create and manage educational content in a Web2.0-like way. We are also involved in *OpenScout*,[5] building an online portal with materials for management education. Going beyond these projects, LearnWeb2.0 is a search and exploration system which allows for organization of resources from all over the web.

*Metamorphosis*$^{+}$[6] is a Semantic social platform for annotation and sharing educational resources across the web. It has been implemented as a testbed for the mEducator[7] European project metadata description scheme, where we participate, and is based on Linked Data. Smart search and enrichment mechanisms allow users not only to search for educational resources across the web, but also to enrich existing metadata with original structured annotations. LearnWeb2.0 provides similar functionalities, and extends them with the possibility to organize results in groups, and rate and discuss them.

In a second category, Web 2.0 discussion and annotation environments such as Microblogs [4], [7], Wikis and Forums can support learners' communication, collaborative project-work, and cultural competence training during the study of a second language [15]. Typically, such tools provide specific functionalities in a closed environment. LearnWeb2.0 goes one step further and supports search for new resources in an integrated way, where users can find different types of resources and share them with their colleagues and friends in their social networks.

A system outside these categories, but interesting in the way it integrates Web 2.0 services, is *Graaasp*[8] [3]. It can serve simultaneously as an aggregation, contextualization, discussion, and networking platform, a shared asset repository, or an activity management system.[9] While in Graaasp the main focus lies in project management and activity organization, LearnWeb2.0 was designed as a collaborative tool for searching and sharing resources, and working with them in a critical way.

## 4 The LearnWeb2.0 Platform

LearnWeb2.0 is a learning and competence development environment, which supports collaborative *sensemaking*,

2. http://ocw.mit.edu/index.htm.

3. http://www.apple.com/education/itunes-u/.
4. http://www.edshare.soton.ac.uk/.
5. http://www.openscout.net/.
6. http://metamorphosis.med.duth.gr/.
7. http://www.meducator.net/.
8. http://graasp.epfl.ch.
9. http://role-showcase.eu/node/21/description.

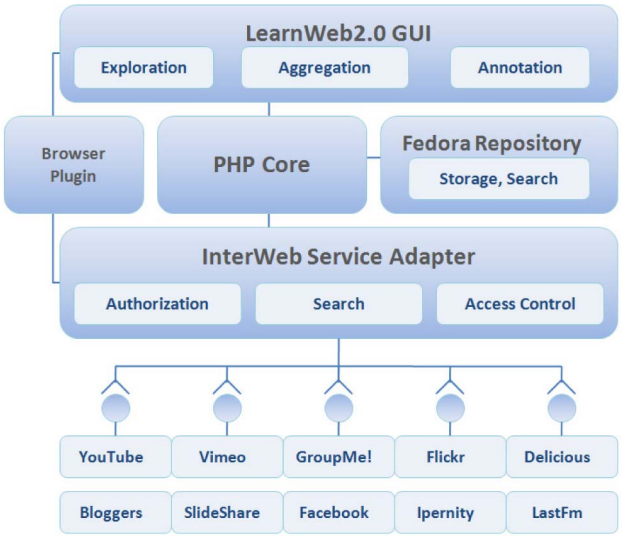


Fig. 1. LearnWeb2.0 architecture.

allowing users to share and collaboratively work on resources from the web. One key design principle was to connect LearnWeb2.0 to the network of popular existing Web 2.0 systems frequently used by our target users. In this way, LearnWeb2.0 users build on their experiences with these systems. In Section 4.1, the system is described from the conceptual level of supporting *sensemaking*. In Section 4.2, we give an architectural overview, describe the main modules and explain how LearnWeb2.0 makes use of existing Web 2.0.

### 4.1 Conceptual Overview

Web 2.0 resource sharing systems allow users to upload and share content. However, most of these platforms only support specific media types, and are limited to specific functionalities, supporting our three *sensemaking* features only partially. In the following, we describe how the platform supports the user during the three phases of the *Sensemaking/Design* process.

*Search and exploration of resources.* LearnWeb2.0 provides users with a search interface for resource discovery across various Web 2.0 services, including LearnWeb2.0 itself. Uniform authorization enables learners to query for resources distributed in different platforms comparable to a conventional search engine.

LearnWeb2.0 provides an integrated view on the search results obtained from all integrated Web 2.0 services. Using the advanced search functionality, the learner can select a set of resources based on a common property like a tag, a file type, a time stamp, or combinations thereof. On the server side, search requests for the integrated services are generated from the user's query so that they correspond to search functionalities supported by a particular service. Responses from different services are combined into a single RSS atom feed made available to the user along with a rendered list of search results. Typically a search result contains a title, a preview image, and optionally a more detailed description. The feed can be used as a standing query in any RSS reader, monitoring the appearance of new resources for that query.

These capabilities provide a seamless view on all resources stored in the various Web 2.0 accounts of the

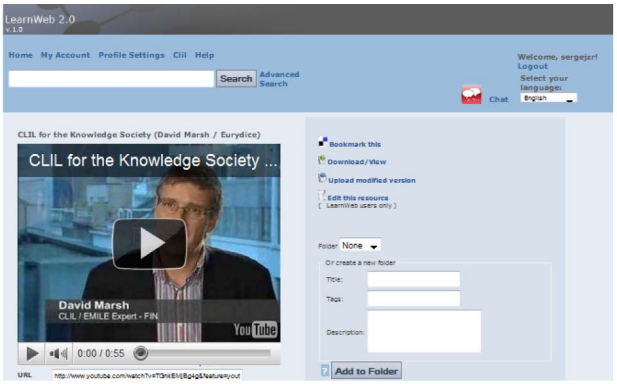


Fig. 2. LearnWeb2.0 resource view.

users, creating their Personal Web 2.0 Learning Space. In order to support collaborative searching, LearnWeb2.0 provides automatic resource annotation. Once a search result is displayed in LearnWeb2.0, it is automatically tagged with the corresponding query terms. These tags can later be used by other users to search and explore the learning resource spaces available in LearnWeb2.0.

*Annotation and discussion of resources.* References to selected resources are stored in the LearnWeb2.0 repository. Different references to the same resource can be added to the repository in different learning contexts. Resources in LearnWeb2.0 can be bookmarked, tagged, rated, and discussed by other users who are allowed to access them. Hence, the LearnWeb2.0 community can collaboratively identify the best learning resources for specific learning domains. Comments on particular learning resources can further be used by authors to improve their resources.

*Upload and aggregation of resources.* To support resource aggregation, LearnWeb2.0 (in its first version) relied on GroupMe! Users can create groups of learning resources to bundle resources that belong to the same learning context. Users can be members of the same group so that several users can contribute resources. Groups are fully visualized, i.e., images include previews and videos can be directly watched. Using LearnWeb2.0 users can also upload a resource from their computer or from an external source to a suitable Web 2.0 tool and enrich it with useful annotations.

### 4.2 LearnWeb2.0 Architecture and Implementation

Fig. 1 depicts the LearnWeb2.0 architecture and shows the Web 2.0 services integrated into our system. The LearnWeb2.0 core and interface version 1 (Fig. 2) is implemented using the PHP programming language and the open source CakePHP framework.[10] The application is built as a set of modules for functionalities described in Section 3.2. We use the MySQL database to store application related data (e.g., user details, profile settings, translations, and logs). LearnWeb2.0 provides grouping based on the integrated GroupMe! component and makes use of a Fedora repository as the main resource annotation and storage facility. Our Web 2.0 service adapter InterWeb is used as an exhaustive source for new web resources.

*InterWeb.* LearnWeb2.0 uses existing Web 2.0 services as a storage platform, which means that core functionalities

10. http://cakephp.org.

implemented by our modules are mapped to the Web 2.0 services preferred by the individual user. We developed the InterWeb module as a server application, which provides a seamless web service interface to access a number of popular Web 2.0 sources and social networking systems such as YouTube, Flickr, Facebook, and LastFm, with the potential to add more. InterWeb provides Web 2.0 functionalities such as authentication, search, social network exploration, and resource upload. LearnWeb2.0 users do not login to each Web 2.0 system, but authorize InterWeb to access these services, benefitting from LearnWeb2.0's single sign on functionality.

The service adapter modules map functionality to specific Web 2.0 services. LearnWeb2.0 uses web service calls to InterWeb, which propagates them to each of the integrated applications, aggregates all results into one result object and returns it to LearnWeb2.0. InterWeb is provided with an API and is available as a web service for all authorized applications. To use InterWeb the user requests an API key accompanied by a secret token. The authorization component is also used when third-party applications access InterWeb services. The InterWeb authorization component complies with the OAuth[11] protocol and REST. During the registration process every LearnWeb2.0 user also obtains an InterWeb account. It is possible to create a "default user" account and copy it to other users so that a class of students can easily obtain a default set of Web 2.0 accounts and immediately start working with the system. Later on it is possible for each student to switch from the InterWeb account to their own Web 2.0 tools accounts.

*Fedora repository.* Working with digital objects requires a sustainable technology for creating, managing, publishing, sharing, and preserving metadata content such as title, tags, description, and user comments. For this purpose, we integrated Fedora, as open source software developed by "Fedora Common."[12] The Fedora Repository manages digital objects, organized in hierarchical structures, and stored in XML format. In this repository, digital objects from different Web 2.0 sources can be annotated with metadata. Core data for resources are stored in Dublin Core[13] format. The core can be extended with additional metadata linked to this object. Data storage and retrieval is carried out using query languages such as RDQL and SPARQL.

*Single sign on.* Not all tools provide token-based authentication mechanisms; Slideshare and Delicious, for example, directly need user credentials (login and password) to access the API. To enable single sign on for those tools, we save credentials in encrypted form on our server and thus provide a uniform authentication interface to all tools through the LearnWeb2.0 GUI and its services.

*User groups.* In social networks, the user can create and join interest groups—a feature we have extended into the collaborative learning process. Every user can create a group and let others join; the group page gives an overview of both members and their resource folders. In the CLIL context, these groups help users focus on a particular learning task and group all relevant resources in one place. Users can join or leave a group at any time.

11. http://oauth.net.
12. http://fedora-commons.org/.
13. http://dublincore.org.

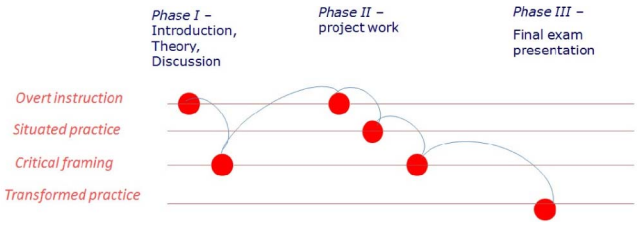


Fig. 3. Course phases and multiliteracies pedagogical moves.

## 5 Two Case Studies

As part of our first development cycle, we used and evaluated LearnWeb2.0 in two CLIL courses in the Summer semester 2010, one at the Leibniz University of Hannover, Germany, the second at the University of Pavia, Italy. Marenzi et al. [19] contain a preliminary evaluation of the first course.

### 5.1 CLIL Course and Learning Design

#### 5.1.1 English Language Teaching in Hannover

The target group attending the CLIL seminar "English Language Teaching Methodology" in Hannover included trainee students and future CLIL teachers. The course was held from April to July 2010. Twenty five students registered, 10 of them out of interest, without credit points. We structured the seminar into three phases, where the first phase provided the necessary background information on CLIL, the second involved the students in project work simulating their future CLIL teaching at school in terms of lesson design, and the third required them to present the result of their design in a final presentation to the classroom (see Fig. 3).

*Phase I. Introduction, theory, discussion: Overt instruction and critical framing.* In the first part of the seminar, the procedure adopted was to move from theoretical aspects of CLIL theory to the analysis and discussion of real cases using videos. This phase included two assignments: 1) a CLIL Learning Module: reading a text on CLIL development in Germany and listening to an expert talking about CLIL and the CLIL community, 2) Reading and classroom discussion: development of observation and reflection competences by watching and discussing classroom recordings together. Students used Stud.IP, an online learning platform for individual study. Within the seminar, Stud.IP was mainly used as a repository of text and audiovisual materials, providing a basic text by Zydatiß [31] on CLIL from a German perspective, and expert commentaries on CLIL methodology as video interviews. Students were asked to read the relevant sections of the texts, to provide an oral summary of the readings assigned and to lead a group discussion on their potential application in various CLIL contexts. In class, we provided video sequences of CLIL classrooms on various subjects and printed handouts on materials used. After reading and watching the video, the most important phase was discussing the CLIL concepts from both a theoretical and practical perspective (done in class).

*Phase II. Project work: Situated practice.* The goal of the second phase was to consolidate each student's expertise in applying CLIL principles and encourage a process of adjustment and further reflection. This phase focused on the collection and integration of appropriate CLIL materials

for a lesson; students were required to undertake laboratory work in order to understand the basic principles of retrieving resources that are likely to support their understanding of CLIL. They were divided in small groups (two to four students), based on a cross-curricular topic or based on their second subject (geography, history, biology). In their assignments, students used LearnWeb2.0 to search for and to organize resources for their specific subject from the web, and to discuss them.

Searching in the web is useful in a CLIL context because a lot of authentic material is provided and trainee teachers can find various representations of different subjects to get a diverse picture of what is available, and to provide more information to their future pupils.

*Critical framing.* The process of acquisition and extension of resources from a large data set implies a fundamental rethinking of the constraints and affordances in the structuring of CLIL content and requires considerable reflection and practice on the part of each student. Despite the huge amount of available resources on the web, not all of them are reliable and suitable for learning. An important task for trainee teachers is to critically analyze the material they found and select suitable educational resources for CLIL lessons. Trainee teachers were encouraged to use LearnWeb2.0 for sharing resources and collaboratively discuss their course development strategies through ongoing step-by step negotiation with other participants.

In a preliminary stage in the Laboratory, we provided training (*Overt instruction*) in the use of LearnWeb2.0.

*Phase III. Final exam presentation: Transformed practice*. In this phase, trainee teachers were required to be functionally selective and creative in designing a CLIL teaching unit for their future pupils at school, characterized by a clear structuring in terms of objectives, phases, and expected results. When they use their materials (available designs) to create a new structure (transformed practice), teachers do not simply replicate found designs, but they can express their creativity in creating new designs. They also need to use language and language examples carefully to be clear and easily understood by their future pupils.

This work of appropriately reapplying contents and redesigning meanings was propaedeutic to the final step in the seminar: the trainee's oral individualized presentation of CLIL in the last lessons, where they described their lesson plans for a CLIL teaching unit.

### 5.1.2 English for Special Purposes (ESP) in Pavia

In Pavia, we dealt with a different context: the students involved were 18 first-year undergraduate students enrolled in the degree course in Dentistry (Faculty of Medicine) taking a compulsory course in English for Special Purposes; the ESP syllabus required them to apply multimodal semiotics to the analysis of English-language Public Information Films (PIF), mostly dealing with medical issues. The students were encouraged to look beyond cultures where English is the mother tongue but to prefer films using English. The course was held from May to June 2010. The course design includes a more general part (written tasks) and a more scientific part focused on medical aspects (oral activities and final exam).

The students were divided into six groups; they used LearnWeb2.0 to search for multimedia resources relating to a specific thematic area associated with PIFs (e.g., domestic violence, road safety, and paedophilia) and then negotiate decisions about their choice and analysis of the films within a peer assessment process. The course led up to a final exam presentation in which each student presented the results of the research vis-à-vis the group's conclusions and their own personal conclusions.

*Phase I. Introduction and theory: Overt instruction*. In this phase, the teachers provided the necessary background information on multimodality and film analysis. The coursebook [2] provides a toolkit for the analysis of complex texts and genres. Students learned about multimodal theory and how to carry out multimodal text analysis, studying printed, website, digital, and film texts in English and the ways in which they are used in different medical contexts. The course dealt with the following themes: causality; colours in semiotic systems; context; diagrams, framing, information management, integration of semiotic resources, intertextuality in scientific texts; metafunctional analysis, negotiation, and interpersonal relations, organization of the scientific printed and webpage; phonetic and prosodic elements, primary and secondary discourse genres; projection, trajectories and transitivity in medical texts.

A few preliminary activities were carried out in a lab to introduce the LearnWeb2.0 system, to search for new resources and to learn how to organize the resources in folders and collaborate with other colleagues negotiating materials (i.e., commenting, tagging, and rating resources). During a teacher-led class, they also carried out an analysis of the PIF genre guided by the teachers.

*Phase II. Project work: Situated practice*. In the second phase, students, partly in the classroom, partly working from home, concentrated on group project-work: online searching for and rating of PIFs, discussing their views within their group and with the teachers. Students were divided in groups and searched on the web for videos related to the PIF genre to create a corpus. The videos had to be representative of different cultures and cover different themes for the various project groups.

Search on the web was required to get access to appropriate and diverse materials. Written and oral language are no longer separated, but various modes such as written and oral language, visual, audio, gestural, and spatial representation, are mixed in the new media (e.g., videos and websites) as well as in our everyday experience. Different structures and various kinds of texts can be found, which describe the same content in various ways (Available Designs). Students can find available resources and codes around them, as well as given conventions in their context and cultures (or different contexts and cultures). Additionally, they can learn a language in different contexts and genres (different ways of using and learning a language) and not only through a traditional grammar.

*Critical framing*. After collecting the videos in LearnWeb2.0, each group of students analyzed their corpus identifying the cultural characteristics and the structural schemas in the video.

From the linguistic point of view, students were asked to acquire a specialized knowledge of English that demonstrated his/her understanding of how events, processes, theories, and opinions are expressed not just through linguistic resources but through a multimodal integration

of resources: linguistic, visual, spatial, and temporal. They learned the language and the terminology by watching videos that talk about the content.

From a multiliteracies perspective, students realized possible ways how to represent the same contents and how to design new meanings in a creative way. In this phase, students were interested and motivated, purposive and selective. They rated PIFs, and discussed how to select appropriate resources for their final project presentation. Discussion and critical analysis happened often face-to-face, and partly in the LearnWeb2.0 Forum.

*Phase III. Final exam presentation*: *Transformed practice.* In the third phase of the course the focus was on individual exam preparation and presentation of the final corpora by the various groups. Students were asked to select two videos from the corpus they collaboratively created during the project work, and to analyze and discuss them in class using a PowerPoint presentation.

Students should express their subjectivity and creativity in creating new designs by intersecting their social and cultural experiences. When they used the materials (Available Designs) to create a new structure (Transformed Practice), they should not simply replicate found designs, but express their identity and their personal voice. In the presentation, they used the language at an academic level to present the contents but also to carry out a metatextual analysis of their work.

The final exam took the form of a mini-lecture lasting 15-20 minutes, in which two films from different cultures but with the same theme were compared by each student. Students were asked to show clarity and mastery of argumentations in English corresponding to the B2 level.

## 5.2 Evaluation Design (First Evaluation Cycle)

We investigated and analyzed the following issues:

1. Background: What was the students' background, how was LearnWeb2.0 integrated into the course?
2. Search: How useful were searching functionalities for students, how appropriate were they for the course?
3. Collaboration: How far did annotation functionalities support collaboration between the students?
4. Technology: What technical issues surfaced during the courses?
5. Transferability: Would the students use our system in other contexts? How did the teachers comment on the experiments carried out and use of LearnWeb2.0?

Our *qualitative evaluation* consisted of two questionnaires delivered online through Google Document forms and a final interview. In the questionnaires, we included questions on the use of Web 2.0 tools and on specific LearnWeb2.0 functionalities meant to support collaboration. Questions were multiple-choice and checkboxes, plus a space for additional comments. The first questionnaire checked students' previous experiences and their expectations about the CLIL course while the second evaluated the use of LearnWeb2.0, to check whether and how its specific functionalities support the learning process and whether students perceive it as a useful tool for their future work. In the interviews, we asked more in-depth questions about the students' experiences and opinions.

Our *quantitative evaluation* was based on the log files of the LearnWeb2.0 platform. User actions and navigation were aggregated for each user and session from the log files. We logged resource selection, rating, commenting, and tagging, as well as search and group actions.

### 5.2.1 Evaluation Hannover

**Issue 1: Background/course design.** From the CLIL seminar, the students expected mainly to learn how to design CLIL materials and a teaching unit. They already used Web2.0 tools to search for literature and share resources but considered social networks as a private activity. For the question "Which prerequisites and competencies do you think are needed for collaborative self-directed learning?" all students chose searching, while only five selected collaboration.

**Activity analysis.** The main features provided by LearnWeb2.0 cover two issues: searching and collaboration. In the following paragraphs, we present an activity analysis of how the students used the system regarding these two aspects, based on a thorough evaluation of the questionnaires and the LearnWeb2.0 log files. During the two rounds of collecting resources on CLIL and subsequently on the subjects of interest, the students in Hannover collected 18 videos, one PPT presentation, four pictures, and three bookmarks but did not put much effort into searching multimedia resources on the web. Only four students filled in the last online questionnaire, the answers we got are inconclusive.

**Issue 2: Search.** Among the resources they retrieved, all four students found videos particularly helpful; one student also mentioned images. However, students mentioned that they needed additional resources to design their lesson, and used books and conventional web search engines as helpful sources of information. The relevance of resources depended on the subject of interest. In CLIL the "content drives the curriculum," but it is not easy to find good CLIL material for all subjects. Physics, biology, history are favored by the CLIL approach because scientific experiments or historical events are shown in videos and images; it is still difficult to find good CLIL material about religion, because most resources are localized and carry culturally loaded meaning. Regarding methodology, it is clear that the students expected to attend a course with standard lessons; they were not used to search on social platforms to discover resources, even as examples posted by people living in a specific context.

**Issue 3: Collaboration.** Regarding the focus on collaborative search, sharing, and commenting of resources, the students in Hannover did not exploit the functionalities provided by LearnWeb2.0 (rating, tagging, commenting) because they did not work online but met in person and searched together using only one computer. The discussion and selection of the resources took place offline during those F2F sessions, which they found very satisfying and efficient.

Interestingly, all students considered as positive the use of user-generated content in formal learning. At question 35. *Do you think that in formal learning situations, this tendency (user-generated contents) can be positive (increase creativity and motivation) or negative (difficult reliability of information sources and disorganization of the content results*), all students considered user-generated content positive in formal learning situations. While at first, this seems to be a contradiction to their reluctant uptake of LearnWeb2.0, we think this

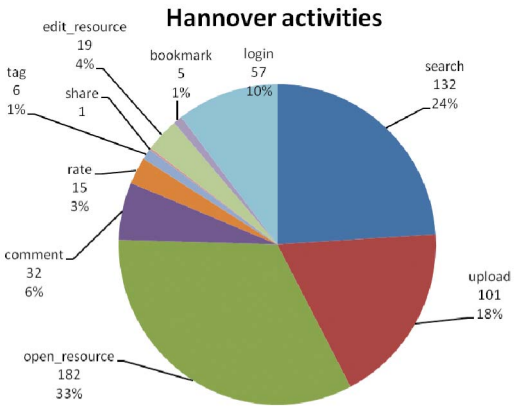


Fig. 4. Hannover activities.

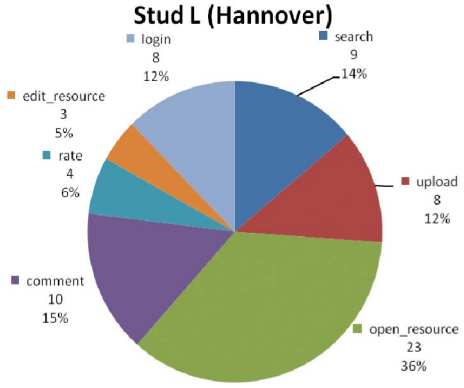


Fig. 5. Stud L (Hannover).

underscores the fact that the task they had to perform just did not call for some of the functionalities LearnWeb2.0 is specialized to deliver.

**Activity log analysis.** In addition to our questionnaire-based analysis, we carried out an activity analysis based on the activity logs written by LearnWeb2.0. These logs store each activity of a LearnWeb2.0 user with the appropriate time stamp. After extracting 10 different activities from the log, we separated activities into sessions performed by users, and analyzed them both on an aggregate level as well as on an individual level for specific users.

Fig. 4 shows the overall behavior of the Hannover students during their course. As expected, search activities take a large part of the overall activities, about 24 percent, as well as upload activities with 18 percent, i.e., students search for appropriate materials using LearnWeb2.0 and upload selected ones into the LearnWeb2.0 repository. So 42 percent of the activities are clearly related to search. Additionally, we have a large proportion of open_resource activities (33 percent), which are triggered whenever the user opens, displays or redisplays the metadata page of an already stored resource. This occurs when the user edits its metadata (before and after the edit action), when the resource is stored in a folder, or also when the user simply looks at an already stored resource to check for comments and other metadata.

Regarding collaboration, the activity logs reveal relatively few collaborative actions. Commenting, rating, and tagging only make up 10 percent of all activities, which is in

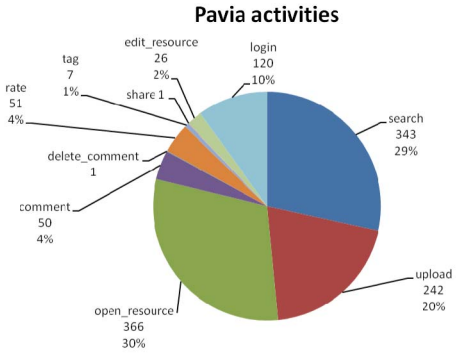


Fig. 6. Pavia activities.

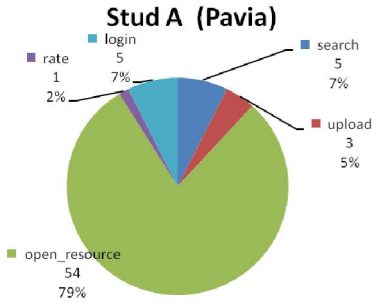


Fig. 7. Stud A (Pavia).

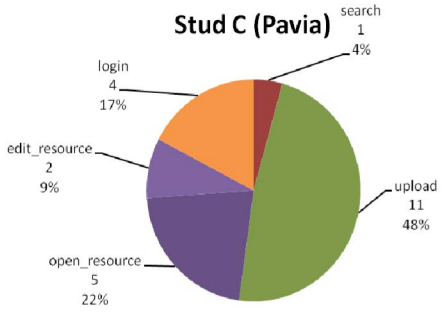


Fig. 8. Stud C (Pavia).

contrast to the goal of the students voiced in Questionnaire 1, where they planned to use a Web 2.0 tool not only to search for resources but also to share them with other students and to actively collaborate with them.

We think that students did not use the sharing functionalities of LearnWeb2.0 as much as anticipated, because they collaborated and discussed sitting together at one computer, and did not need to collaborate online. However, some uses of the open resource action may also represent a kind of sharing/collaboration behavior, where students view resources uploaded by other students in their group. This is supported by looking at some specific student profiles (Stud L from Hannover (Fig. 5), but even more Stud A from Pavia (Fig. 7)), who have a disproportionally large proportion of open resource actions. Stud C instead has a larger proportion of upload actions (Fig. 8).

Another observation is the low use of tags in Hannover (and Pavia (Fig. 6)). We think this is caused by the classwork setup, where students collected a restricted number of resources, so the Title and Description were enough to describe a resource and more meaningful to use than tags.

**General issues.**

**Issue 4: Technology.** The students also pointed out technical problems; the most significant ones the system speed and the only partial integration of LearnWeb2.0 with GroupME!.

**Issue 5: Transferability and teacher feedback.** When we asked the students whether they could imagine using LearnWeb2.0 in other contexts, their feedback was positive.

> Stud F: When we had this discussion about the great famine in Ireland, it was very easy to find nice pictures of, for example, the statues in Dublin. So, yes, LearnWeb2.0 is helpful to find pictures to specific topics especially if I don't know what to search. For example, in Google search I probably need to put in "statue in Dublin" or something like that to find it, and LearnWeb2.0 got it via the text that was added by some other people as a famine related topic.

The Hannover CLIL course teacher, Rita Kupetz, made useful comments on the course focus pointing out that students showed a certain reluctance to work with our research prototype: "The striking phenomenon is certain reluctance in terms of research and new media. This time the technology enhanced environment was offered as a rich but extra learning environment because we assume that the CLIL teacher community needs social networking and students should experience it at university; students were not forced to use it. From earlier e-Learning projects [17] we know that students sometimes have to be pushed by making the usage of technology part of their assignments. Our master students are rather focused on their credit points and do not invest time for extras."

She pointed out the need for project work and task-oriented learning, but remarked that the tasks she gave to the students did not really require access to a large number of resources: "The scenarios used in the CLIL seminar supported the teacher students' learning about CLIL. The project work made them search for appropriate material and the process of designing tasks for their pupils made them apply the knowledge gained about CLIL which they did creatively with all types of materials (text and digital). However, the task design was rather classical, not making the move from the personal to the web. Further opportunities need to be designed in teacher education to enable student teachers to transform their beliefs so that they are able to create critical classrooms for the 21st century using new literacies and various tools of technology [20].

### 5.2.2 Evaluation Pavia

**Issue 1: Background/course design.** Nineteen students filled in the first questionnaire. Pavia students searched more privately: 13 (69 percent) students already used Web2.0 tools to search for literature for private reasons, two (11 percent) at the University, and two students in both settings. Similar to Hannover, most students (95 percent) claimed they would use Web 2.0 tools to prepare the final project work for searching, 18 (95 percent) to share resources within the group, 10 (53 percent) to annotate/comment resources.

Student expectations were both related to the course topic itself as well as the teaching approach and tools. Stud 2 mentioned the opportunity of group work *"... I'm sure it will be very interesting because I think we will work in groups using very different resources, such as websites, videos and so on"* and Stud 6 expected from the course *"to study the science dentist language, to practice my English with experienced teachers, to recognize the new way to study English."*

At the end of the course, 17 students filled in the second questionnaire, substantially more than in Hannover.

**Activity analysis.**

**Issue 2: Search.** Since LearnWeb2.0 main goal is to support searching, sharing, and discussing of multimedia resources, the Pavia task (i.e., analysis of public information films) was closer to the functionalities provided by the system. As specifically required by the task, the students in Pavia searched for videos across cultures, and they were satisfied with the results. In contrast to Hannover, 88 percent of the students considered the materials they found with LearnWeb2.0 adequate. They also found other resources such as images helpful in refining their presentations. During the interview Stud M remarked that they retrieved all 14 films through LearnWeb2.0. Students appreciated the opportunity of searching in different Web 2.0 tools without having to access separate sources.

**Issue 3: Collaboration.** As expected, search and aggregation were the most important functionalities. It is interesting to compare the almost equally high value of "discussing and commenting resources" versus the low value for "rating" and for "tagging" resources. Rating and tagging are important in typical Web 2.0 environments, where users want to share many resources and find them again later on, and thus prefer to input short tags or rate resources.

In learning contexts, where the task is to describe and comment a small number of resources, providing a longer comment makes more sense. During the final interview Stud M told us that he used LearnWeb2.0 both in the classroom and at home *"because through LearnWeb2.0 we can share videos and comments. [...] I made comments about the characteristics of the video (participants, processes and circumstances), the meaning and the message which is given by the video."* Rating resources makes sense in an asynchronous setting, where students can use them to tell their collaborators which of the resources are most helpful.

**General issues.**

**Issue 4: Technology.** Technology-related remarks made by the students in Pavia were similar to Hannover, but more positive. The major difficulties were related to speed and technical problems: Stud 1: "I found LearnWeb2.0 slow. Maybe some problems about the server which doesn't work properly." Stud 9: "I had difficulties in finding the resources because the results of the searching were often too little. I also had problems in using the platform for many technical problems, such as the difficulty in using GroupMe!"

**Issue 5: Transferability and teacher feedback.** Regarding transferability, the students had interesting ideas about using LearnWeb2.0 in other contexts. Stud MA told us "I think I could use it to make all kinds of research if I need some videos or pictures, and I already used it for my hobby (motor bikes)."

Equally interesting are the comments made by one of the two course teachers, Anthony Baldry. He pointed out the possible focus as follows: "What is the goal of LearnWeb2.0? Is it for higher education (teacher-focus) or for intelligent young adults (student-focus)? In many ways the system started out as the former but is, rightly, moving toward the latter." He commented on reliability and speed of the system: "The dentistry students perceived this as the area in which much progress was made as they were testing

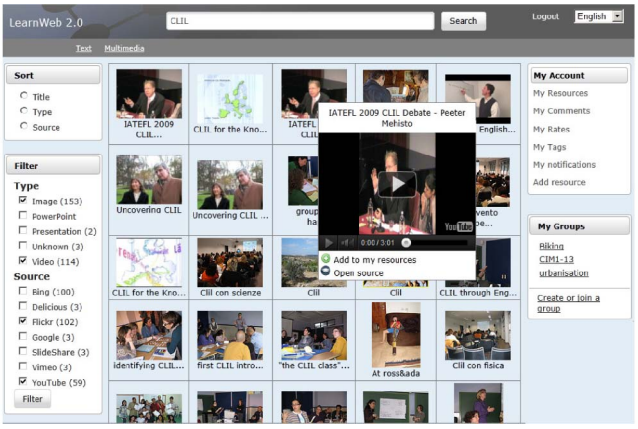


Fig. 9. LearnWeb2.0 resource explorer.

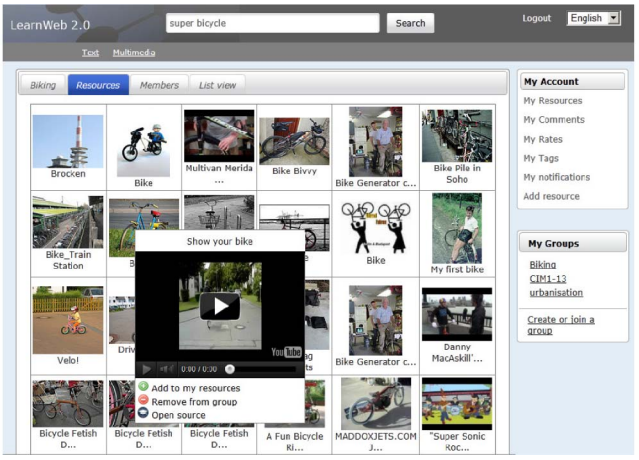


Fig. 10. LearnWeb2.0 group view.

out the system but where further progress could, should, and would be made."

### 5.3 Different Cultures and Expectations

*Acceptance of the system.* In Hannover students expected a standard design and they worked with traditional kinds of materials (school books, references, and recorded interviews provided by the teacher). The trainee teachers were free to use any kind of material (written/digital texts, information from the Internet, multimedia resources) to better understand CLIL and to design as final project a CLIL teaching unit. It was more difficult for them to find relevant resources using LearnWeb2.0 because they were looking for traditional written texts, while the platform is designed to provide Web 2.0 resources (multimedia and recommendations by other people). Moreover, the role of LearnWeb2.0 was not decisive in increasing the credits so that the use of technology was considered as an additional load. When technical problems occurred, German students did not ask for technical support until the next lesson and this increased their frustration. Hannover students were much more focused on their subject and on a traditional way of teaching; they expected to attend a normal course with standard lessons.

In Pavia, on the other hand, the system was central to the course, helping students to find many multimedia resources for their CLIL/ESP related tasks, the objective being to train students to think about and experiment with the principles of a specific discipline: multimodality (CLIL) as well as mastering specific biomedical terminology (ESP). Students were asked to search specifically for videos regarding Public Information Films. They were encouraged by the teachers to use LearnWeb2.0 to search and organize at least 12 videos in group folders. Pavia students were also more curious about the novelty of the system and interested in its functionalities. All students worked with the system and asked immediately when they had problems. This helped them to cope much better with some of the rough edges of our system.

*Collaboration.* In both evaluations we noticed the relatively low use of our collaboration functionalities in the courses. In retrospect, we realize that this was due to the setup which easily allowed F2F discussions and collaboration. A few students explicitly mentioned that they came to the course as they wanted to learn together with other students, not remotely.

*Different tasks.* Student tasks to be performed through LearnWeb2.0 varied considerably between our two scenarios. This made us aware that the tasks given by the teacher are another important factor determining student satisfaction with our platform.

## 6 LearnWeb2.0 Second Version

The feedback provided by teachers and students in our two first case studies was encouraging in many aspects, but also revealed critical deficiencies and useful improvements required on the functional as well as conceptual level, motivating the redevelopment of the system in 2011. We sketch the most important improvements below.

*Efficiency*. We reimplemented the new LearnWeb2.0 using JAVA and JSP. This lead to substantial speed improvements, making search in LearnWeb2.0 comparable to searching the Web 2.0 repositories themselves, with multithreaded access to these services.

*User interface.* We improved the user interface for search and communication by introducing intuitive AJAX-based control elements for more efficient collaborative work and meaningful supporting messages displayed in a more uniform way compared to the previous release.

*Usability.* The key component of the new version of the LearnWeb2.0 system is the resource explorer which provides a better resource overview inspired by the Google and Bing results display. We increased the number and the size of the thumbnails in the result list and added a mouse over form which allows the user to preview and collect a resource without leaving the search context. Fig. 9 shows the explorer with the new faceted search control for source and media selection on the left as well as the resource preview in the middle. This makes search in LearnWeb2.0 comparable to Google and Bing, but additionally provides storage, aggregation, annotation, and discussion functionalities for search results.

*Collaboration.* We improved the presentation of groups within the system, supported by a new LearnWeb2.0 component instead of using an external tool (GroupMe!). Fig. 10 shows the improved view of a LearnWeb2.0 group with tabs added for the group overview, members and resources. Groups also have access to their activity statistics. A forum module has been integrated into the system to support communication between students.

*Awareness.* In order to improve the tutors' awareness, we integrated rich usage logging. The generated graphs provide usage information over time spent, monitoring specific user activities as well as providing insights into system usage and features such as searching or rating.

*Second evaluation cycle.* The second evaluation cycle started in summer 2011, in order to assess and evaluate the second version of LearnWeb2.0. A questionnaire for user interface satisfaction has been prepared to collect preliminary feedback from the users during Summer 2011, also used in the Winter semester. The first results we got in July (21 students of Dentistry in Pavia) show that the users are much more satisfied. They appreciated the much faster speed and the clearly improved usability.

In the winter semester, we used LearnWeb2.0 in a German course of a high school in Hannover and again at the Leibniz University of Hannover. At the Leibnizschule in Hannover, the case study involved pupils from eighth and 12th grade collecting and discussing materials from the web related to postwar literature [14].

Since a few months we are also supporting the Yell project,[14] where LearnWeb2.0 is used as a community platform for teachers interested and active in language learning for children. The Yell teachers and trainee teachers focus on selecting, classifying, and discussing suitable materials for language learning and for improving their own teaching, in order to provide a rich source of formats in multimodal and context-specific language use, supported through our platform.

According to the YELL administrator Maria Bortoluzzi, "the platform meets the needs of language teachers and trainers with the support of a community that sustains and motivates teachers and trainee teachers through sharing resources, ideas, suggestions within a humanistic framework of peer-teaching and peer-learning."

## 7 Reflections

### 7.1 The Design-Based Approach and Development

The LearnWeb2.0 system was initially developed within the EU project TENCompetence. The aim of the project was to develop a technical and organizational infrastructure to support lifelong learning in Europe serving the needs of individuals, groups, and organizations. The resulting Personal Competence Manager (which included LearnWeb2.0 as one component) has been tested in a set of pilots. However, the LearnWeb2.0 component had not been at the center of the evaluations performed, so we got relatively little feedback on how to further improve it.

Talking with colleagues in Hannover and Pavia, however, LearnWeb2.0 as a system for collaborative searching and sharing of multimedia resource in a CLIL context generated so much interest, that we decided to further develop and adapt the system specifically for this target audience. Given that the requirements of our users were different from the users originally targeted in TENCompetence, continuing to develop the system based on iterative development and evaluation cycles as suggested by the design-based research methodology turned out to be a good idea. Developers and evaluators (researchers) as well users of the system (university teachers and students) worked together in the first evaluation cycle to test the system, collect feedback, and implement improvements in the new version.

Using LearnWeb2.0 in our CLIL specific setting helped us in understanding the shortcomings of the system in this context and enabled us to build a second substantially improved version. It speaks to the quality of our initial ideas and architecture that the new version inherited most of the initial ideas and functionalities, but in addition provides them now to the students in a much more integrated and user-friendly way. With the speed and interface improvements of the second version, LearnWeb2.0 is now closer to a production system, and can be used without having to ignore annoying problems which were present in the first version.

### 7.2 The Multiliteracies Approach and CLIL

Framing our work within the multiliteracies approach, as suggested by our CLIL colleagues in Hannover and Pavia, helped us to understand several pedagogical implications and support students and teachers in the CLIL context. We know better how our technology is helpful for improving teaching and learning in specific situations. When we discuss the use of LearnWeb2.0 for language learning, we can easier connect the functionalities of the infrastructure to learning design and to the pedagogical setup in a multiliteracies context. We can now better explain which educational setup is best supported through our system, which functionalities are helpful for different learning and teaching processes, and which pedagogical activities are better supported through face-to-face interaction.

Connecting multiliteracies notions and LearnWeb2.0 functionalities motivated us to introduce more support for the Critical Framing phase, including easier commenting facilities and a discussion forum. Related to Transformed Practice, we integrated Google Docs to support collaborative writing (redesign of new meanings) and we are experimenting with the use of LearnWeb2.0 groups and discussions to support more creative and innovative presentations of the project work, compared with the traditional PPT slides. One of our current priorities is to provide better support for reusing and working with resources already available (i.e., preselected and commented) in LearnWeb2.0 as new available designs for other users.

Talking with colleagues in the teaching and teacher training community continues to be a rewarding experience and provides a source of continuous input to the development of LearnWeb2.0. Our recent collaboration with the Yell project is an interesting example for the use of LearnWeb2.0 as a community platform supporting the multiliteracies approach for language learning and for teacher training.

## 8 Conclusions

In this paper, we discussed our pedagogical setup and experiences for CLIL based on a multiliteracies approach, and presented the LearnWeb2.0 platform, supporting this approach through providing access to authentic material, as well as critical selection and discussion of these material. We presented two case studies, which showed both successful uptake as well as limitations of system usage and functionalities; both feedbacks were very helpful as input for further improvement of the system and to consolidate our approach. We reflected on the use of an evaluation-driven design-based research approach, which

14. http://yell.uniud.it/?lang=en.

enabled us to iteratively and substantially improve the system for our intended target users, as well as on the multiliteracies approach for language learning, which provided us with helpful guidelines both for pedagogical setup as well as for system development.

We are continuing to support CLIL colleagues in various language learning scenarios, and we are focusing now on harnessing the opportunities of the web to provide language learning materials through LearnWeb2.0 as a community platform for Italian teachers. Another ongoing discussion concerns the extension of LearnWeb2.0 to more explicitly support workflow management and recording of the whole *sensemaking* process in the context of building and analyzing multimedia corpora.

## ACKNOWLEDGMENTS

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